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EXAMINER	
ZERVIGON, RUDY	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 12/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/460,638	FLUGAUR ET AL	
	Examiner	Art Unit	
	Rudy Zervigon	1763	

-- The MAILING DATE of this communicati n appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 September 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-10, 12-17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foster et al (USPat. 5,665,640) in view of Ishikawa et al (USPat. 6,143,078). Foster et al teach a device (item 58; Figure 2; col. 18 lines 33-59; items 270-272 and conduit 256; Figure 2B; col. 18, lines 33-59) and method for its fabrication consisting of:

i. a one-piece outer portion (item 271; Figure 2B; col. 18 lines 33-59) consisting of an electrically insulative material (271; "ceramic insulator"; col. 18 lines 42-43), having dimensions effective to prevent or inhibit plasma (col. 18, lines 33-58) arcing (col. 18 lines 50-58) to an electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58) of a plasma processing chamber (item 40; Figure 2) aperture ("within cylinder 238"; col. 18, line 53), through a wall (43; Figure 2) of the plasma processing chamber (item 40; Figure 2), and fit securely into the plasma processing chamber (item 40; Figure 2) aperture ("within cylinder 238"; col. 18, line 53) - as shown by Figure 2B, Foster et al teaches such a tolerance for the aperture ("within cylinder 238"; col. 18, line 53) (items 271) as being the accommodating dimensions in supporting plates 272, 241, and 239

ii. an inner opening (item 256;Fig.2B; col. 18, lines 33-58), communicating through the electrically insulative material (271; "A ceramic insulator"; col. 18 lines 42-43) between a bottom and a top of the outer portion (271), the inner opening having dimensions effective to

enable transmission of a physical signal ("RF"; col. 18, line 54) or a gas, gas mixture or other material through the device (item 58; Figure 2)

iii. A plasma processing chamber (item 40; Figure 2) having at least one aperture ("within cylinder 238"; col. 18, line 53) therein, the at least one aperture ("within cylinder 238"; col. 18, line 53) having an exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58), and located inside the aperture ("within cylinder 238"; col. 18, line 53), as claimed in claim 2

iv. A method of making a plasma processing chamber (item 40; Figure 2), the chamber (item 40; Figure 2) having at least one aperture ("within cylinder 238"; col. 18, line 53) therein, the at least one aperture ("within cylinder 238"; col. 18, line 53) having an exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58), the method consisting of inserting (screws holding plates 272,239; Fig. 2B) the device (item 58; Figure 2; col. 18 lines 33-59; items 270-272 and conduit 256; Figure 2B; col. 18, lines 33-59) of Claim 1 into the aperture ("within cylinder 238"; col. 18, line 53), as claimed in claim 3

v. A method of processing a workpiece, consisting of the following steps, as claimed in claim 4 of:

a. exposing the workpiece (228; Figure 2B; 48; Figure 2) to a plasma (column 13, lines 35-52) in the chamber (item 40; Figure 2) as claimed in claim 2

b. transmitting a signal ("RF"; col. 18, line 54) through the device (item 58; Figure 2; col. 18 lines 33-59; items 270-272 and conduit 256; Figure 2B; col. 18, lines 33-59) out from the chamber (item 40; Figure 2)

vi. A plasma processing chamber (item 40; Figure 2), as claimed in claim 5, having at least one aperture ("within cylinder 238"; col. 18, line 53) therein, the at least one aperture ("within

cylinder 238"; col. 18, line 53) having an exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58) , and

vii. a one-piece sleeve (271; Figure 2B) inside the aperture ("within cylinder 238"; col. 18, line 53), the one-piece sleeve (271; Figure 2B) consisting of an electrically insulative material (271; "A ceramic insulator"; col. 18 lines 42-43) and having:

a. dimensions effective to prevent or inhibit plasma arcing (col. 18 lines 50-58) to the exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58) of the aperture ("within cylinder 238"; col. 18, line 53) and to fit securely into the aperture

b. an inner opening (conduit for RF energy; column 18, line 54) communicating through the electrically insulative material (271; "A ceramic insulator"; col. 18 lines 42-43), the inner opening having dimensions effective to enable transmission of a physical signal ("RF"; col. 18, line 54) or a gas, gas mixture or other material through the device (item 58; Figure 2; col. 18 lines 33-59; items 270-272 and conduit 256; Figure 2B; col. 18, lines 33-59)

viii. A method of making a plasma processing chamber (item 40; Figure 2), as claimed in claim 6, the chamber (item 40; Figure 2) having at least one aperture ("within cylinder 238"; col. 18, line 53) therein, the at least one aperture ("within cylinder 238"; col. 18, line 53) having an exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58), the method comprising inserting a one-piece sleeve (271; Figure 2B) into the aperture ("within cylinder 238"; col. 18, line 53), the one-piece sleeve (271; Figure 2B) consisting of an electrically insulative material (271; "A ceramic insulator"; col. 18 lines 42-43) and having:

a. dimensions effective to prevent or inhibit plasma arcing (col. 18 lines 50-58) to the exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58) of the aperture ("within cylinder 238"; col. 18, line 53)

b. an inner opening (conduit for RF signal; col.18, line 54) communicating through the electrically insulative material (271; "A ceramic insulator"; col. 18 lines 42-43) between a bottom and a top of the one-piece sleeve (271; Figure 2B), the inner opening having dimensions effective to enable transmission of a physical signal ("RF"; col. 18, line 54) or a gas, gas mixture or other material through the one-piece sleeve (271; Figure 2B)

x. A method of processing a workpiece (item 228; Fig.2B), as claimed in claim 8, comprising:

a. exposing the workpiece (item 228; Fig.2B) to a plasma in a chamber (item 40; Figure 2), the chamber (item 40; Figure 2) having at least one aperture ("within cylinder 238"; col. 18, line 53) therein, the at least one aperture ("within cylinder 238"; col. 18, line 53) having:

i. an exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58); and a one-piece sleeve (271; Fig.2B) in the aperture ("within cylinder 238"; col. 18, line 53), the one-piece sleeve (271; Fig.2B) consisting of an electrically insulative material (271; "A ceramic insulator"; col. 18 lines 42-43) and having:

ii. dimensions effective to prevent or inhibit plasma arcing (col. 18 lines 50-58) to the exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58) of the aperture ("within cylinder 238"; col. 18, line 53) ; and to fit securely into the aperture

iii. an inner opening (conduit for RF power; Col.18, line 54) communicating through the electrically insulative material (271; "A ceramic insulator"; col. 18 lines 42-43) between a

bottom and a top of the one-piece sleeve, the inner opening having dimensions effective to enable transmission of a physical signal ("RF"; col. 18, line 54) or a gas, gas mixture or other material through the one-piece sleeve (271; Fig.2B); and

iv. transmitting a physical signal ("RF"; col. 18, line 54) or a gas, gas mixture or other material through the one-piece sleeve (271; Fig.2B) into or out from the chamber (item 40; Figure 2)

xi. A method of operating a plasma processing chamber (item 40; Figure 2), as claimed in claim 9, wherein the chamber (item 40; Figure 2) has at least one aperture ("within cylinder 238"; col. 18, line 53) therein and the aperture ("within cylinder 238"; col. 18, line 53) has an exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58), the method comprising the steps of:

a. initiating a plasma in the chamber (item 40; Figure 2), the aperture ("within cylinder 238"; col. 18, line 53) having the device (item 58; Figure 2; col. 18 lines 33-59; items 270-272 and conduit 256; Figure 2B; col. 18, lines 33-59) of Claim 1 therein, then

b. cleaning (col.30; line 14) the chamber (item 40; Figure 2) and the device (items 271; Figure 2B; col. 18 lines 33-59; col. 18; lines 22-24)

xii. The method of Claim 9, wherein said plasma exists in said chamber (item 40; Figure 2) for a predetermined period of time (col. 3, lines 1-7), as claimed in claim 10

xv. The device of claim 1, as claimed in claim 12, wherein the one-piece outer portion (271; Figure 2B) further comprises:

a. lower section (portion 270/271/256; Figure 2B), having a shape approximate the aperture to fit into the aperture, with a first length, as claimed in claim 12, contained within 238/232 and

an upper portion (portion 270/271/256; Figure 2B) outside of 238/232, the lower section having a first width (diameter) effective to fit in the plasma processing chamber (item 40; Figure 2) aperture ("within cylinder 238"; col. 18, line 53) within a predefined tolerance

xvi. Foster teaches the device (item 58; Figure 2; col. 18 lines 33-59; items 270-272 and conduit 256; Figure 2B; col. 18, lines 33-59), as claimed in claim 12, is held in the plasma processing chamber aperture via a predetermined amount of pressure against a wall of the aperture as claimed in claim 13 – the predetermined amount of pressure against a wall of the aperture as claimed is taught by Foster according to the fastening means (see screws, not labeled; Figure 2B) provided by Foster.

xvii. Foster teaches that an outer surface (top surface of 272) of the device (item 58; Figure 2; col. 18 lines 33-59; items 270-272 and conduit 256; Figure 2B; col. 18, lines 33-59) forms a non-orthogonal angle of 0° with reference to the bottom (bottom planar surface for 270, 271) of the device as claimed in claims 16 and 17

Foster does not teach that the one-piece sleeve has a flange section configured to remain outside the aperture through the chamber wall as discussed above. As a result, Foster does not teach the relative dimensions of the flange section and the lower section. Foster further does not teach forming the bottom of said one-piece sleeve (271; Figure 2B) to a plane having a non-orthogonal angle relative to the inner opening of said aperture ("within cylinder 238"; col. 18, line 53), as claimed in amended claim 7.

Ishikawa teaches a similar device (302; Figure 5) used to deliver process gas to a treatment chamber (column 9, lines 45-64). Specifically, Ishikawa teaches a one-piece sleeve (outer

surface of 302) with a flange section (302/314 interface) configured to remain outside the aperture.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to construct Foster's one-piece sleeve to include a flange section configured to remain outside the aperture as taught by Ishikawa and to optimize the dimensions of the flange section, the lower section, and the bottom planar angle of Foster's one-piece sleeve.

Motivation to construct Foster's one-piece sleeve to include a flange section configured to remain outside the aperture as taught by Ishikawa and to optimize the dimensions of the flange section, the lower section, and the bottom planar angle of Foster's one-piece sleeve is to enhance hermeticity of the process chamber as taught by Ishikawa (column 10, lines 20-28). Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04).

3. Claims 11, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foster et al (USPat. 5,665,640) and Ishikawa et al (USPat. 6,143,078) in view of Bernard J. Curtis (USPat. 4,328,068). Foster and Ishikawa are discussed above. Foster and Ishikawa do not teach a physical signal ("RF"; col. 18, line 54) from the device of claim 1 consisting of a spectroscopic endpoint detection signal or a channel therefore.

Bernard J. Curtis teaches a spectroscopic endpoint detection signal and a channel therefore (34,36,32; Figure 3; column 2, lines 59-68).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Foster and Ishikawa's RF physical signal as discussed above with Bernard J. Curtis's spectroscopic endpoint detection signal.

Motivation to replace Foster and Ishikawa's RF physical signal as discussed above with Bernard J. Curtis's spectroscopic endpoint detection signal is for determining the end point of the plasma etching process as discussed by Bernard J. Curtis (column 1, line 67 - column 2, line 5).

Response to Arguments

4. Applicant's arguments filed September 4, 2003 have been fully considered but they are not persuasive.

5. Applicant states:

"

Foster appears to be silent regarding the cylinder 238 having an electrically conductive surface and (ii) the isolator sleeve 271 preventing or inhibiting plasma arching to an conductive surface of the cylinder 238.

"

As stated above, and in prior actions, Foster teaches the at least one aperture ("within cylinder 238"; col. 18, line 53) having an exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58), and located inside the aperture ("within cylinder 238"; col. 18, line 53). And, Foster was cited as teaching a one-piece outer portion "isolator" sleeve (item 271; Figure 2B; col. 18 lines 33-59) consisting of an electrically insulative material (271; "ceramic insulator"; col. 18 lines 42-43), having dimensions effective to prevent or inhibit plasma (col. 18, lines 33-58) arcing (col. 18 lines 50-58) to an electrically conductive surface (item 222; Fig.2B;col. 18

lines 50-58) of a plasma processing chamber (item 40; Figure 2) aperture ("within cylinder 238"; col. 18, line 53).

6. Applicant's arguments centered on the newly amended claim limitation where "Claim 1 further provides that the aperture is through a wall of a plasma processing chamber.", Applicant is directed to the above new claim rejections necessitated by Applicant's amendments. To this same argument, Applicant states "The cylinder 238 of Foster does not appear to extend through a wall of a chamber 220.". However, the Examiner asserts that it is Foster's plasma processing chamber aperture ("within cylinder 238"; col. 18, line 53) that extends through a wall (43; Figure 2) of the plasma processing chamber (item 40; Figure 2), and not Applicant's "cylinder 238" of Foster. Compare Applicant's "chamber aperture" (not shown; page 7, lines 10-15) with Foster's chamber aperture ("within cylinder 238"; col. 18, line 53).

7. Applicant argues that Foster does not teach the newly amended claim limitation of "a flange section configured to remain outside of the wall". Applicant is directed to the new grounds of rejection based on Applicant's amendment and necessitated therein.

8. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, there is some teaching, suggestion, and motivation to combine the teachings of Foster with Ishikawa. In particular, both Foster and Ishikawa are concerned with hermeticity as a

result of the high vacuum pressures that each respective chamber must operate under – See Ishikawa (column 9, lines 6-15) and Foster (column 5, lines 22-34, column 10, lines 55-60).

9. Applicant's arguments with respect to claim 4 are directed to the new amendments to claim 4. Applicant is directed to the new grounds of rejection of claim 4.

10. Applicant's arguments with respect to claim 7 are directed to the new amendments to claim 7. Applicant is directed to the new grounds of rejection of claim 7.

11. With respect to Applicant's arguments on claim 9, Foster was cited in teaching the method step of cleaning (col.30; line 14) the chamber (item 40; Figure 2) and the device (items 271; Figure 2B; col. 18 lines 33-59; col. 18; lines 22-24).

12. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., with respect to claim 9, "Applicant's representative has been unable to locate any section in Foster or Ishikawa that refers to plasma etching" last paragraph, page 14, first paragraph, page 15) are not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Further, Foster teaches, plasma etching for cleaning (column 7, lines 60-65).

13. With respect to Applicant's arguments of claim 10, Foster was cited in teaching said plasma exists in said chamber (item 40; Figure 2) for a predetermined period of time (col. 3, lines 1-7), as claimed in claim 10 – Foster, in the cited passages, refers to processing steps that are necessarily <u>not</u> infinite due to limits on materials, energy, etc...

14. With respect to Applicant's arguments of claim 13, that Foster is silent with respect to "a predetermined amount of pressure against an inner wall of the aperture." It is noted, per the discussion of Foster's vacuum processing conditions that a requisite amount of a predetermined pressure against an inner wall of Foster's aperture must be inherently applied to sustain the vacuum processing conditions as taught by Foster.

15. With respect to Applicant's arguments of apparatus claim 18, that Foster would not be motivated by the teachings of Bernard J. Curtis (USPat. 4,328,068) because Foster does not teach etching and would then not be concerned with end-point detection as taught by Bernard J. Curtis. To the contrary, Foster clearly cites etching processing in both cleaning operations (column 7, lines 60-65) and otherwise (column 2, lines 22-35). As such, Foster would be motivated by the teachings of Bernard J. Curtis as discussed above.

16. Applicant states that "the proposed modification of the isolator sleeve 271 of Foster per Curtis would appear to conflict with the principle of operation of the isolator sleeve 271.." (page 16). However, the Examiner did not state that the modification in combining the references involves alterations of the isolator sleeve: "to replace Foster and Ishikawa's RF physical signal as discussed above with Bernard J. Curtis's spectroscopic endpoint detection signal." Yet, as is noted by the teachings of Curtis's apparatus (Figure 3), Curtis provides both an RF physical signal (25, 14, 16; Figure 3) and a spectroscopic endpoint detection signal (34, 36, 32; Figure 3). As such, the teachings of Bernard J. Curtis provide support for having both signals during processing.

Conclusion

17. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.

JEFFRIE R. LUND
PRIMARY EXAMINER